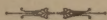


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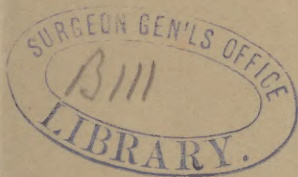
*Compliments of the Author.*

SYNOPSIS OF OBSERVATIONS  
ON SOME OF THE  
RELATIONS OF METEOROLOGY  
AND DISEASE.

BY  
E. A. HILDRETH, M. D.,  
OF WHEELING WEST VA.



Reprint from the Transactions of the  
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WHEELING:

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1879,





# SYNOPSIS OF OBSERVATIONS

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## Relations of Meteorology and Disease.

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BY E. A. HILDRETH, M. D., WHEELING, WEST VA.

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"Climatic influences control health, and mental and physical energy, and upon these depend industry, success and happiness." B. C. B.

Before proceeding in this enquiry, it is proper to draw an outline of the geological formations upon which this city is built, together with a statement of its sanitary surroundings.

The City of Wheeling is situated on the left bank of the Ohio river. Lat:  $40^{\circ}7'$  N. Long:  $80^{\circ}42'$  West, 640 feet above sea level, and is about four miles long, with an average width of one-third of a mile. Beginning at its northern end is a terrace of gravel, elevated about 100 feet above the level of the river, and near the base of the river-hill curving south and east and widening in its course, until it terminates on the north bank of Wheeling creek, immediately south of, and one-fourth of a mile from the "point" of Wheeling hill. This alluvium comprises about two-thirds of the area north of the creek; the remaining third, being forty or fifty feet below it, and at the ordinary height of the river bottoms. The southern extremity of this alluvium rests on the south bank of the creek, and was evidently cut through by the latter, in its passage to the Ohio river. The remaining section south of the creek, is river bottom about two miles long, and about one-half mile wide; about one half of this section was originally covered by swamps and ponds; it is flanked on the east by the river hill. The sides and bases of Wheeling and adjacent hills are covered by a stratum of yellow clay, which dips under the alluvium before described, and emerging from the base of the latter, forms the upper stratum of the river bottom, and varies

in thickness from five to forty feet; hence, the rain-fall upon the neighboring hills is largely filtered through and under the gravel bank to the surface of the sub-stratum of clay to form the swamps, and ponds before described; although the latter, have long since been filled up from openings and cuts through the great gravel-bed, yet the underlying clay being impervious to water, must still allow its accumulation at the lowest levels. Zane's Island is the 7th Ward of the city, contains about 350 acres, and one-eighth of the whole population of 28,000. The elevations of the adjoining hills are from 500 to 700 feet above the Ohio river. The streets are sixty-six feet wide, laid out at right angles, and about one half their number paved with boulders, having gutters on both sides; the waters of which are at a number of points relieved from over-flow by under-ground sewers discharging into the river and creek.

Having made a daily record of the temperature, rain-fall, state of the sky, winds, moisture and other elements of meteorology for the last thirty-four years, and engaged in active practice; I have at the same time noted the character and prevalence of diseases, as they have occurred in my own experience, and that of my colleagues; the purpose of this paper being to discuss and analyze this record, with a hope of eliciting something useful, or at least presenting such a generalization of facts as may assist us in determining the relationship of meteorological changes and disease. The atmosphere, composed of oxygen, nitrogen and carbonic acid in definite volumes, pervaded by light, heat, and electricity; either two of which will generate a third; with an interchange of affinities greatly beyond our present knowledge, highly elastic, and very movable; extending to the supposed height of forty-five miles, and pressing with a weight of fifteen pounds to each square inch (varying with the height above sea-level); always containing water in irregular and uncertain quantities, absorbing and diffusing all kinds of gases; teeming with microscopic life, and a thousand other unknown forces and elements meet us at the threshold of our inquiries. That portion in which we live, say within 6,000 or 7,000 feet of the earth's surface, is made up of strata in a state of continual change in temperature, and electrical conditions, and beyond this is the region of "eternal snow." *Light* penetrates the sub-stratum to reach us—of its essence, I am utterly ignorant, and can only speak of *sunshine*, meaning clear weather; and its influences upon the



growth, vitality, perfection, and well-being of animal and vegetable life. *Electricity* is a force pervading all things; it traverses the air in persistent currents on this part of the northern hemisphere, from South to North, and at this city at a dip of  $84^{\circ} 2'$  to the earth's surface; this was proven by an observation of Prof. John Locke, of Cincinnati, Ohio, on Wheeling Hill in May, 1845—a bar of iron held in this current immediately becomes magnetic; again, I know a room in this city, where, fifteen minutes after entering it your body becomes charged with electricity like a Leyden Jar; by touching an iron mantle-piece, visible and audible sparks pass off from the ends of your fingers, and this may be repeated indefinitely.\* We propose to deal with *heat* only as to its thermometric measurements, and as associated with *humidity*, to study their clinical importance. For some of the facts herein discussed I beg to refer you to an abstract of the climatology of this city for twenty-eight years to January, 1876, published in your Transactions for 1876.

#### SUMMER

in this place does not differ materially from other cities lying at or near the same latitude, and altitude, in the belt of country between the Mississippi river and Atlantic ocean; in fact, our maximum heat does not exceed that of New York city, lying several degrees north; neither are we excelled by Louisville on the south; but variations of temperature are probably greater; *i. e.*, in *June* there are six or eight days, in which, on the same day, the difference in temperature between 7 o'clock, A. M., and 2 o'clock, P. M., will be from  $30^{\circ}$  to  $37^{\circ}$ ; this sudden rise and fall of the mercury, is one of the factors in the generation and type of our diseases. The *mean* variation for *June* (for 28 years) is, max:  $91^{\circ} 81$ —min:  $50^{\circ} 90$ , difference  $40^{\circ} 91$ ; although for more than half the month, the range between morning and afternoon is about  $15^{\circ}$ .†

The relative humidity of *June* is 65 per cent, and the range of dew-point is between  $48^{\circ}$  and  $56^{\circ}$ —*mean temperature* (for 28 years)  $71^{\circ} 05$ . *July* is our hottest month, the greatest heat occurring between the 9th and 15th days. The difference of ex-

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\*Since writing the above, the brick house alluded to was struck by lightning. The bolt impinging upon the chimney passing down the corner to the foundation (stone), was deflected at a right angle, cutting off a large limb of an apple-tree forty feet distant.

† "Heat is the great motive power. 10 per cent of the radiated heat of the earth is intercepted within ten feet of its surface."—KEAMTZ.

tremes falls  $2^{\circ}$  or  $3^{\circ}$  below June, the usual range of the day being from  $10^{\circ}$  to  $20^{\circ}$ . Relative humidity 52 per cent. Dew-point  $55^{\circ}$  to  $65^{\circ}$ . Mean temperature (for 28 years)  $75^{\circ} 08$ .

*August*, during the first, or at farthest the second week of this month, the nights begin to grow cooler; the precipitation of dew, and occurrence of fogs more frequent; the rain-fall is less, with seasons of droughth—old meteorologists ascribed the peculiarities of the weather to the reign of Sirius—the dog-star, hence they are called the *dog-days*. Relative humidity 54 per cent. Mean temperature (for 28 years)  $72^{\circ} 71$ .

In the distribution of storms, those especially attended with thunder and lightning, *June* has from two to five, *July* from four to seven, and *August* from two to five. The mean annual rain-fall from 1848 to 1868, is 31.17 inches; but the increased precipitation of summer during the last ten years (1868 to 1878) has increased the average to 41.22 inches. The great storm-centres lie in the upper Lake region above 43 degrees north latitude. Let us enquire into the antecedents and accompaniments of a *summer-storm*: For from three to ten days, the maximum heat is from 85 to 98 degrees; the earth's surface becoming super-heated, radiates powerfully into the adjacent atmosphere; this produces a strong upward current of rarified air; this partial vacuum being rapidly filled by a colder current, condenses the hygrometric moisture into vapor, forming a *cumulus*—this limits the earth's radiation, and renders the air sultry and oppressive. In the change of hygrometric moisture to the liquid state, latent heat is evolved, and a high state of electric tension induced, its intensity being proportioned to the volume and rapidity of the transition;\* at the same time, that allotrophic state of oxygen we call ozone, is largely generated. This substance, is regarded by the profession, as a destroyer of zymotic diseases, or prophylactic; but, aside from other agencies, I have never observed its effects. Under these conditions of high heat and moisture, the nervous and circulatory systems are strongly impressed, enervated, and the vital forces weakened—when, in addition to other diseases shortly to be named, *sun-stroke* is one of the results. That high-heat alone does not produce it, I quote Dr. Lemen: (Colorado Transac-

\*"For every cubic foot of rain condensed and precipitated from pre-existent vapor, 1110 degrees of latent heat is diffused and rendered sensible enough to raise over 100,000 cubic feet of air 48 degrees," which sudden increment would stifle us, but, for the kindly offices of the winds, in diffusing into space the great excess.



tions, 1878.) "Although certain valleys and plains in Colorado, experience a very high degree of heat in summer, yet, *sun-stroke* is reported to be wholly unknown. We believe the writers on this subject are right in attributing to the extreme *dryness of the air*, their entire exemption from the fatal effects of high temperature."

The topography of this city, renders it liable to summer storms, yet, they are never attended with the violent winds reported to accompany them in the open and level country west of us. Our attendant rain-fall is often excessive—we have known 5.40 inches to be precipitated within two hours, which is nearly double the average quantity for a month. The adjacent hill-sides, and steep grades of many of our streets, flood the latter, and by this washing out, would appear to be salutary—but the same waters traversing yards, filling up, and overflowing holes and depots of garbage, carry it along, to be deposited at some more level point, or obstruction, and thus, rather stir up, and disseminate mephetic gases, than correct the existing evil. Surely the popular idea of a summer-storm "purifying the atmosphere," has not been realized. Dr. I. I. Ratton, Prof. of Surgery, Medical College at Madras, writing on Tetanus in the general Hospital, says: "and cases frequently occurred after a rain-storm." Evaporation from the earth's heated surface, too rapidly surcharges the air with moisture. High heat and moisture, are the necessary conditions inducing the putrifactive and other fermenting processes, and doubtless essential to the generation of those vegetable and animal germs, in the lower orders of organic life, which are now considered to be the primary causes of many forms of diseases; below a certain temperature, they either cease to exist, or become inactive and harmless.

#### INTESTINAL DISEASES.

Under this head are noted, Cholera Infantum, Diarrhea, Cholera Morbus, and Dysentery, as the regular summer visitors; averaging the time of their prevalence for twenty-eight years fixes June, July, and August, or the summer months as the period. The first cases occurring the first week in June, as a general rule, exceptionally earlier, if the temperature should be above the average; showing the direct influence of high heat and its attendants, either in itself, or by predisposing to the action of other causes, in producing this class of diseases.

As the heat of July exceeds that of June, so is there a proportionate increase of bowel complaints, declining in frequency with the diminished heat of August, until their subsidence, at least by the first or second week of September. This effect of unusually high temperature to increase the number, violence and fatality of our prevalent summer bowel complaints, has been so constant and uniform, as to have become the common observation and experience of our medical faculty. This was well marked in 1872; the *means* of July and August reached 77°33, when the number of cases were doubled, and mortality increased 30 per cent.

I have dwelt upon high temperature, and its consequent climatic conditions as a primary factor in the development of intestinal diseases; other factors, in the form of filth and its emanations, and all those surroundings known as a bad sanitary condition should also enter into our calculations.

Among intestinal diseases of summer, none are more constantly met in our daily visits than *Cholera Infantum*, popularly called "*Summer Complaint*," and in fact, prevailing exclusively at this period. Very few children in this city pass their second summer without an attack. It is well known, that during this period of dentition, the intestinal glands are undergoing a peculiar process of development, to adapt them to the assimilation of a mixed diet, herein, lies its essential pathology.

The meteorological characteristics of the season, will determine the mildness or severity of the endemic; if it is wet, and stormy, with a continuous high temperature, the cases will be numerous and violent; if, on the contrary, the summer heat is below the usual mean, the disease is mild and easily controlled; its complications are similarly modified. In 1877 a majority of cases terminated in entero-colitis. There is no disease; not even Yellow Fever in its periodical visitations; whose outbreak, duration, and type, is more certainly caused, and governed by meteorological conditions than *Cholera Infantum*.

Examining my notes for over thirty years, I find it begins the first week in June (rarely the last week in May), and continues to the first week in September—seldom later. At, and below a maximum temperature of 65° it ceases. From the valuable reports of our city health officer, Dr. S. L. Jepson, I find the mortality of *Cholera Infantum* compared with the deaths from all causes, during the summers of 1873, 20 per cent; of 1874, 26 per cent; of 1875, 23 per cent; of 1876, 16.1 per cent.



It is doubtful whether the above statistics indicate the true mortality: As 'convulsions' are not the uncommon proximate cause of death, it is certain that a large percentage of deaths reported from 'convulsions,' strictly belong to this disease.

*Diarrhœa*.—This class of cases occurring in adults and young persons are quite dissimilar in their etiology and treatment. The larger number, arising from the use of crude and improper ingesta; the summer heat acting as the predisposing cause; yet, there are a considerable number in whom the conditions of heat and moisture induce a catarrhal state of the intestinal mucous membrane, or mis-secretion known as 'biliousness.'

*Cholera Morbus*.—Although sporadic cases occur at all seasons of the year, yet during the summer months, it is so much more frequent and fatal, as to be fairly classed among the other forms of bowel diseases prevailing during hot weather. Sporadic cases at other seasons, in their symptoms, course, and termination, more usually (not always) agree with the old English definition, viz: "a vomiting and purging of bile, with sometimes cramps in the abdomen." The general history of our summer Cholera Morbus, is a vomiting, and purging, first, of the contents of the stomach and bowels, rapidly followed by copious serous, or rice-water stools, with cramps of the extremities, coldness and lividity of the surface, hoarse or whispering voice, and an entire suspension of the secretion of urine and bile. Having passed through four epidemics of Asiatic cholera, I am unable to discover any difference in the symptomatology of the two diseases; nor much inequality in their mortality; yet, my convictions are, that they are distinct diseases, arising from separate causes; there is this highly important distinction, that our summer cholera or Cholera Morbus is not *infectious*, nor *portable*; whilst Asiatic cholera *is*. The true pathology of the former is held to be "an extraordinary disturbance of the *balance of the circulation*," and experience has proven when this is restored, reaction and natural heat established, recovery begins.

The hygienic and sanitary surroundings of both diseases are unquestionably of great value, we have no desire to under-rate them; but an epidemic of Asiatic Cholera pursues its onward course regardless of *cold* or *heat*, infecting the human body, and making *it* the carrier and communicator of its peculiar poison.

The outbreak of epidemics of cholera morbus in this city during the last thirty-four years, have been so generally co-incident with excessive and continuous heat, and its attendant



changes, as, in my limited observation, to assign them, as the exciting causes. To ascribe it to "the epidemic constitution of the atmosphere;" aside, from the existing meteorological conditions, is a subterfuge of ignorance. The sewerage, and other sources of contaminated air in this city have for a number of years remained about the same; (notwithstanding the laudable efforts of our Health officers, who have never been entrusted with power to remove them;) yet, it is a matter of observation, that during cool summers this disease occurs sporadically, or not at all.

The most notable endemic happened in the summer of 1873. The first case on the 27th June, on Zane's Island, no other case occurred in that neighborhood. Second case July 6—in Centre Wheeling—about one mile distant from first case. Subsequently, numerous cases in different parts of the city; without the good or bad sanitary condition of their location, appearing to have any influence whatever over its generation or type. The following meteorological states were observed during this endemic, viz.: The first twenty-one days of June (1873) were dry, only .23 rainfall, and cool; the maximum temperature seldom above  $75^{\circ}$ , and on the 22d day the mercury rose to  $92^{\circ}$ , and ranged below to  $86^{\circ}$ —during the remaining eight days, were three storms, besides three more rainy days, with a rainfall of 3.22 inches—the mean temperature of this June  $75^{\circ} 33$ , over  $5^{\circ}$  above the mean of 23 years. July followed with an increased mean temperature; a maximum of  $98^{\circ}$ , and seven storms. The mean temperature of August was  $69^{\circ} 66$ —that of the preceding 23 years  $71^{\circ} 05$ . First frost occurred on the 15th of September—the average time. We thus state the meteorological facts of the endemic of 1873 because of its severity; it is however only a type of less violent endemics of previous years, since the advent of Asiatic Cholera in this city in 1849. The elements of *heat and moisture* have so constantly preceded and attended such outbreaks, as to form the basis of a reasonable conclusion, that *without them* this form of disease will not happen; because the occurrence of cooler weather and diminished moisture, is followed by a subsidence of the endemic; as shown in the August weather above stated. Frequent observation of the type and duration of this class of summer bowel complaints have proven, that with a mean temperature of  $60^{\circ}$  and below, they do not occur, or cease to exist. The increase of the average summer heat of the last decade, above that of the preceding

23 years is  $1^{\circ} 04$ . During the same period the *annual rainfall* has increased 10.05 inches.

*Dysentery* follows the other forms of bowel diseases, being most prevalent in August and early part of September. This period is attended with cool nights, ( $50^{\circ}$  to  $60^{\circ}$ ), in contrast with a mid-day temperature of  $70^{\circ}$  to  $86^{\circ}$ . It usually disappears after the first frosts. Why *frost* should destroy the poison of Intermittent, and Yellow Fever, and other forms of disease, is an unsolved problem. All experience has proven it to be the greatest and only *certain disinfectant* known. Suffering humanity has reason to rejoice in the fact—a calm, clear sky at night, and a temperature not above  $45^{\circ}$ , brings it. The deaths in this city, from the intestinal diseases named, compared with the total mortality, were for 1873, 21.7 per cent; 1875, 13.1 per cent; 1875, 12.9 per cent 1876, 14.2 per cent; 1877, 9 per cent.\*

#### WINTER.

The meteorological winter months for this latitude, are December, January and February. Our winters are characterized by sudden and great changes. The average *variation* (for 28 years) being, for December,  $46^{\circ} 28$ , January,  $53^{\circ} 46$ , and February,  $45^{\circ} 41$ . The mean temperature for winter, (for same period,) is  $32^{\circ} 64$ . A comparison of the last ten years, with the previous eighteen, will show that December is  $0^{\circ} 28$  colder; January,  $2^{\circ} 66$  warmer, and February,  $1^{\circ} 17$  warmer.

There are two "cold poles" in our winter; one about the 14th January, the other, 9th February. Situated at the foot-hills of the Allegheny Mountains, with a comparatively level country extending to the Rocky Mountains on the west, and Great Lakes on the north, our city participates in the oscillations and perturbations of this extended region.

The prevailing winds are from the West, North-west and North: The course of these winds regulate the temperature and precipitations of rain and snow. The *North* is a cold dry wind, at all seasons, and "clears up" the atmosphere; its humidity seldom exceeds 45 per cent. The *West winds* are the great movers of our *general storms*, their humidity from 80 to 100 per ct. The North-west wind partakes somewhat of a mixed character of the two former—its "*piercing*" effect is sensibly felt by the human body. We have frequent snows, varying in depth

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\*Health Officer's Reports by Dr. S. L. Jepson.

from one-half inch to 12 or 15 inches, the lighter ones are soon melted, the heavier often lie for two or three weeks. Our coldest days succeed the heavy snows. The lowest temperature recorded in thirty years is  $-15^{\circ}$ ; we seldom pass a winter without several days as low as zero. In studying the causes of disease in winter we find low temperature, hygrometric and visible moisture, in their modified forms of fogs, frosts, and vapors, electrical and azonic conditions, acting upon the *skin and respiratory apparatus* inducing *pneumonia*, influenza, bronchitis, catarrhal affections, and rheumatism, as the prevailing diseases of the season. It has been said we have an "outside skin and an inside skin" and that the two are in profound sympathy with each other. We have found the high heat of summer predisposed the intestinal membrane to a variety of irritations and fluxes; in like manner the low temperature and sudden changes of winter, expend their force upon the lungs and air passages; often producing inflammation of one or more of their tissues. Although the diseases named are by no means limited to this season, yet the number and aggravation of cases are so uniform, as to be fairly ascribable to its climatic influences. Aches and pains, neuralgic and rheumatic, mental depression and hebetude, are in the popular mind, the prophetic data of atmospheric changes. The rainy, snowy, dull, dark days of winter, and their attendant sharp piercing winds, make a profound and sensible impression upon animal life. As the air of expiration carries off a large volume of vapor, now, if the *inspired* air be already near the point of saturation, its capacity for further absorption must be greatly diminished or lost, hence, the *number* of inspirations in a given time must be increased, to enable the lungs to throw off the requisite amount of vapor, or else there is an undue accumulation of fluid in the bronchia or air vesicles, giving rise to oppressive and labored breathing; and if sound lungs, are sensible of such influences, it is certain, that weak and diseased ones, suffer proportionate distress and dyspnea. We may illustrate this further on. A high per centage of hygro-metric moisture always precedes precipitations of rain or snow; should the attendant variations of temperature be considerable they occur; but if only a few degrees, no precipitation, but a condensation in the form of fog, vapor, etc., will happen.

The cold of winter suspends chemical affinities, fermentative and putrefactive changes. Below a certain degree, *malaira*



either ceases to affect the human body, or to exist; or if its essence be an organic germ, as is maintained by good authority, then *cold* destroys it.

The air of winter is more condensed, hence an equal volume contains more oxygen; the pulmonary organs are stimulated, æration of the blood more active, "*ubi irritatio ibi humorum affluxus*," is the Hyppocratic aphorism, and may serve to explain some of the inflammatory affections of the respiratory apparatus, especially prevailing in winter. The direct effect of cold upon the surface of the human body, is to contract the capillary and smaller vessels, expelling the blood, and inducing internal engorgements and congestion.

#### RESPIRATORY DISEASES.

The prevailing diseases of this class, are Pneumonia, (often complicated with Pleurisy), Influenza, Bronchitis, Catarrh and Coryza. As before stated, they are not confined exclusively to this season, but the observation of many years will prove that nearly double the number of cases occur in the winter. This refers more particularly to where they do not happen as a complication of other diseases.

That the character of the weather, its sudden and violent changes is a primary factor, in exciting this class of diseases, is a matter of such constant observation and experience as probably to require no further argument or demonstration. In this neighborhood, during the prevalence of the northerly and westerly winds, which are loaded with moisture, keen and piercing, I have seen many cases of Pneumonia, and Pleuropneumonia rapidly follow exposure, and as opposed to periods of low temperature, which are calm and dry. The testimony of Physicians within the belt or zone of this latitude, confirm this statement. A recent writer, (Dr. E. F. Wells, Minitie, O.), states, "of 100 cases of Pnumonia, 70 occurred in December, January, February and March—a sudden temporary fall of the mercury caused many cases." In the annual reports of the mortality of this city for the five year's ending December 31, 1877, are 167 deaths from Pneumonia, as follows: For December, January, February and March, 71; April, May, June, July and August, 42; September, October and November, 54—of this latter number, 15 occurred in November. During epidemics of whooping cough and measles, Pneumonia is the complication especially feared in winter.

*Influenza* (epidemic catarrh), *Bronchial Catarrh*, *Coryza*, and

*Catarrh.* Dr. Thomas Watson says: "Catarrh is the commonest of all disorders. Not one man in ten thousand passes a *winter* without having a *cold* of some sort, and this name points to its ordinary cause; *cold* somehow applied to the body."

For more than thirty years I have noticed and recorded the epidemics, and endemics of the various types, and grades of catarrh. Winter is the great period of their prevalence, although not unfrequent in the first fall and spring months.

In this city when after several days of drizzling, rainy weather, it becomes foggy, and the coal smoke settles down on the face of the earth, endemic catarrh to a greater or less extent, is almost sure to happen. I have recorded this fact so often as to be able at such times to predict its occurrence. The mercury will usually average about  $35^{\circ}$  with a variation seldom exceeding  $5^{\circ}$  or  $10^{\circ}$ . After our general snow storms, if there should be a sudden rise of temperature attended with a thaw, catarrhs are very common. In the above instances the relative humidity will be above 85 per cent, although there has been more or less uniformity in the advent of our *endemics* of catarrh in connection with the atmospheric conditions above stated; it is only partly true of the sudden and wide-spread *epidemics* of influenza. The antecedents and consequents of heat, cold, moisture, pressure, electrical states, etc., are sometimes so dissimilar as to make one doubt their agency alone; the inference is, that new factors are added (at present unknown), to bring about the results. The most noted epidemics here of influenza was in the winter of 1840. One-half our population were attacked within twenty-four hours; it was called the "Tyler Grippe." Soon after the outbreak, I embarked on a steamer for St. Louis, when fully two-thirds of the persons on board were affected; many so enfeebled as to confine them to bed. Our boat appeared to infect every point at which she landed. At Cincinnati this was notably the case. Previous to our arrival it had not existed, and twenty-four hours afterwards thousands were attacked. The same thing happened a few hours after our arrival at St. Louis. These facts would point to infection, or a *portable materies morbi* as the chief cause. That "a particular state of the atmosphere" is the assigned cause of such epidemics, is the testimony of many accurate observers, *i. e.* Short, in his Chronological History of the weather, says "that thick, ill-smelling fogs, preceded some days the terrible epidemic catarrh of 1557. Iussien states, it appeared

in France in 1733, "immediately after offensive fogs, more dense than the darkness of Egypt." "It was preceded by a dark fog in London, 1837" (Watson). "Crews of separate vessels have been attacked at sea in 1833" (Watson). In the epidemics named more than one-half the population were attacked within a few hours. The climatic conditions were peculiar and strongly marked. On the 13th of November, 1872, "the epizootic" or horse disease (epidemic influenza) broke out in this city and neighborhood. By the 18th inst. nine-tenths of our stock of horses were attacked, ten deaths were reported. Cases continued to occur until the 8th of December. This outbreak was preceded by three days of fog, rain and snow. The weather during the 26 days of its prevalence, showed 23 rainy, murky and snowy days, and three clear days. Lowest temperature, 14°; highest, 56°; daily average, 35°. Before the subsidence of the "epizootic" and for 25 days afterwards, our citizens suffered the same form of catarrh most severely. During this period the dew-point varied between 29° and 43°—average relative humidity .852. About the same state of weather being present in February, 1873, was followed by a similar outbreak.

The mortality of Respiratory Diseases in this city, (except consumption) compared with the deaths from all causes is for 1873, 9.7 per cent; 1874, 9.4 per cent; 1875, 15.3 per cent; 1876, 14.4 per cent; 1877, 9.8 per cent; 1878, 15 per cent.\*

I have endeavored to draw an outline of *summer* and *winter* with their most prevalent diseases. The limits of this paper will not permit an examination of *spring* and *fall*; nor of that large class of diseases which are known to happen during the entire year; I hope to present this at some future period.

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\*Reports of Drs. Jepson and Ward, Health Officers.







